Fuel cell to take off in 2006

Fuel cells, touted as a long-lasting power supply for mobile devices, have proved to be a promise unfulfilled. But, a new report from market researchers NanoMarkets LC, predicts developments in the marketplace will make 2006 the take-off year for mobile fuel cells and by 2010 NanoMarkets projects a market worth $1.6bn and about $2.6bn in 2012.

The report identified four significant developments as the reason why industry watchers should take the mobile fuel cells market seriously:

• Burgeoning Power Requirements. The absence of a power source that can supply many power hours between charges is now the single biggest obstacle to ubiquitous computing and smart phones. Nokia actually cancelled a smart-phone product because its numerous features drained the battery too fast. Meanwhile, Japan's mobile phone makers will add power-hungry digital broadcast tuners to their mobile phone models. Fuel cells are a way to meet these increasing demands.

•The new "complementarity." In the past, batteries and fuel cells were seen as locked in a battle for future mobile computing and communications. Now a new paradigm is emerging. Fuel cells will be introduced, initially as portable rechargers for batteries or in hybrid fuel cell/battery combos, in which fuel cells provide long-lasting power: batteries deal with power spikes. Even by 2010, NanoMarkets claims that more than 80% of fuel cells will be used with batteries.

• Big backers. The heavyweights of the electronics and computing industry are backing fuel cells. IBM and Sanyo have announced plans to produce a direct methanol fuel cell (DMFC) for the IBM ThinkPad. Other big names that see opportunities in the budding-mobile fuel cell market include 3M, Cabot, Casio, Fujitsu, Hitachi and Johnson Matthey, Motorola, NEC, Samsung, Sony and Toshiba.

Aprilia have been working on fuel cell technology for several years. Together with Swiss electric and fuel cell component manufacturer MES-DEA, they showcased their latest fuel cell scooter prototype, the Aprilia Atlantic Zero Emission. This advanced model is equipped with a 6kW (about 8hp) PEM fuel cell which is fitted, together with the hydrogen storage and electrical engine, in the normal engine compartment of the scooter. A top speed of around 85km/h can be achieved and the riding range is up to 140km.

•Advances in Technology. The emergence of more efficient DMFC fuel cells, that operate at lower temperatures, has made fuel cell technology much more viable for mobile applications. In the future, nano-catalysts, new polymers and nanomaterials for membranes are likely to make for even better energy density in mobile fuel cells.

Oxides take a combined bow with genetics

The National Science Foundation has established two new Materials Research Science and Engineering Centers (MRSECs) at Yale University, and the University of Washington, with a combined NSF investment of up to $14m over the next six years.

The centers will also receive substantial support from participating academic institutions, state governments and industry.

The Center for Research on Interface Structure and Phenomena will investigate the electronic, magnetic and chemical properties of complex oxide materials (as predicated by September's NAMBE conference) and their interfaces, with potential applications to magnetic storage, spintronics, and chemical sensing. The Center is a partnership between Yale University, Brookhaven National Laboratory and the Southern Connecticut State University.

The Genetically Engineered Materials Science and Engineering Center, at the University of Washington, will support innovative research and education that integrates modern biology with state-of-the-art chemical synthesis, to construct hybrid materials that cannot be achieved through traditional biology or chemistry.

Each award is initially for six years; renewed NSF support is possible through competitive review in the fifth year of the award. In addition to the two new centers, another eleven existing MRSECs successfully renewed support in open competition in FY 2005. (Some 29 Centers are currently supported by the MRSEC program with annual NSF support of $52.5m).

Each Center has made a substantial commitment to effectively integrate its educational activities with its scientific research program, and to fully develop its human resource potential.

The educational outreach activities can range from the elementary school to the postgraduate level. Additionally, the MRSECs constitute a national network of Centers that seeks increased impact on materials science and education, beyond what is expected from any one Center.

"Advanced materials are the hidden 'stuff' that enables the modern world to function," said Lance Haworth, executive officer for DMR's division of Materials Research.

"Fundamental research on materials is essential to the nation's health, prosperity and welfare. New materials are key to a whole range of rapidly changing technologies such as energy, computers and communications, transportation and increasingly health-and-medicine-related technologies as well.

"These two new awards join a vigorous network of NSF-funded interdisciplinary Centers, that are doing exciting work at the frontiers of materials research and preparing the next generation of materials researchers."